TRANSLATION

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 63289	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/EP2004/053401	International filing date *(day/month/year)* 10.12.2004	Priority date *(day/month/year)* 24.12.2003
International Patent Classification (IPC) or national classification and IPC G01 K7/32		
Applicant SENSEOR		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 9 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 4 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))

      _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/053401

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (Rule 12.3 and 23.1(b))

☐ publication of the international application (Rule 12.4)

☐ international preliminary examination (Rule 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 1-12 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

nos. _____ as originally filed/furnished

nos.* _____ as amended (together with any statement) under Article 19

nos.* 1-13 received by this Authority on 26.07.2005 with letter of 21.07.2005

nos.* _____ received by this Authority on _____

☒ the drawings:

sheets 1/5-5/5 as originally filed/furnished

sheets* _____ received by this Authority on _____

sheets* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

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Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-14	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-14	NO
Industrial applicability (IA)	Claims	1-14	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

See Supplemental Box.

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

See Supplemental Box.

Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

Box VIII:

1. The application does not fulfil the requirements set forth in PCT Article 6 because **claim 1** is not clear.

1.1 The feature in **claim 1** whereby the angle of the buses to the direction of wave propagation complies with the expression **to the nearest *+/- 0.5 degrees*** is not mentioned in the description. As a result, **claim 1** is not supported by the description, contrary to the requirements of PCT Article 6.

Moreover, the specification "to the nearest +/- 0.5 degrees" appears to be insufficient considering that the angle is between 5 and 6 degrees (as in **claim 3**).

Box V:

Documents

2. Reference is made to the following documents:

D1: BUFF W ET AL: "UNIVERSAL PRESSURE AND TEMPERATURE SAW SENSOR FOR WIRELESS APPLICATIONS" PROCEEDINGS OF THE 1997 IEEE ULTRASONICS SYMPOSIUM. ONTARIO, CANADA, OCT. 5

- 8, 1997, IEEE ULTRASONICS SYMPOSIUM PROCEEDINGS, NEW YORK, NY: IEEE, US, vol. VOL. 1, 5 October 1997, pages 359-362, XP000848493 ISBN: 0-7803-4154-6;

D2: EP-A-0 802 627 (NGK INSULATORS LTD) 22 October 1997.

Document D2 was not cited in the international search report. A copy of said document is attached as an annex.

Novelty

3. The present application fulfils the requirements set forth in PCT Article 33(1) because the subject matter of **claims 1-13** complies with the requirement of novelty defined in PCT Article 33(2).

3. Document D1, which is considered to be the prior art closest to the subject matter of **claim 1**, describes (the references between parentheses apply to said document):

- a remotely readable surface acoustic wave temperature sensor that comprises, on the surface of a quartz substrate having a cross section in direction Y' at an angle θ to direction Y (the abstract and the paragraph entitled "Introduction"),:
  - at least two resonators comprising

transducers consisting of interdigitated electrodes connected to control and design buses in such a way that they have different characteristic operating frequencies (see the paragraphs entitled "Temperature Sensor", "Pressure Sensor" and "Sensor Design");

- a first resonator having a first surface acoustic wave propagation direction parallel to one of the substrate axes, and a second resonator having a surface acoustic wave propagation direction at a non-zero angle (β) to the propagation direction of said first resonator (see figure 5 and the paragraph entitled "Sensor Design").

3.2 It follows that the subject matter of **claim 1** differs from this known temperature sensor in that the control buses in the second transducer are at a non-zero angle to a line normal to the interdigitated electrodes of said second transducer and in that the angle complies with the expression given in claim 1.

As a result, the subject matter of **claim 1** is novel (PCT Article 33(2)).

3.3 **Claims 2-13** are dependent on claim 1 and, as such, therefore also fulfil the PCT requirement of novelty.

Inventive step

4. The present application does not fulfil the requirements set forth in PCT Article 33(1) because the subject matter of **claims 1-13** does not involve an inventive step as defined in PCT Article 33(3).

4.1 The problem that the present invention is intended to solve (see paragraph 3.2) can therefore be considered to be that of compensating for the acoustic wave energy flux divergence relative to the surface acoustic wave propagation direction along the second transducer in an acoustic wave temperature sensor with a quartz substrate.

4.2 The solution proposed in **claim 1** of the present application is not considered to be inventive (PCT Article 33(3)), for the following reasons:

It is a routine technical step to provide "buses at a non-zero angle to a line normal to the interdigitated electrodes" in a surface acoustic wave device with a quartz substrate (see, for example, document D2, page 9, lines 38-43; figures 19 and 20). In document D2, the angled buses are used for the same purpose as in **claim 1**, namely, to compensate for acoustic wave energy flux divergence (see D2, page 9, line 40).

It would be obvious for a person skilled in the

art seeking to solve the stated problem to consider incorporating angled buses in the surface acoustic wave temperature sensor described in document D1.

What is more, the expression in **claim 1** is merely the mathematical expression of this known compensation. In the description, the origin of this expression is not explained but it is, for example, possible that the expression is the result of a polynomial regression of the measurement points. Determining a formula using regression would be a routine technical step for a person skilled in the art and does not involve an inventive step.

It follows that **claim 1** is not considered to be inventive (PCT Article 33(3)).

4.3 **Dependent claims 2-13** do not contain any features which, in combination with the features of any one of the claims to which they refer, might define subject matter that fulfils the PCT requirement of inventive step, for the following reasons:

The features in **claims 2-13** would be routine technical practice to a person skilled in the art.